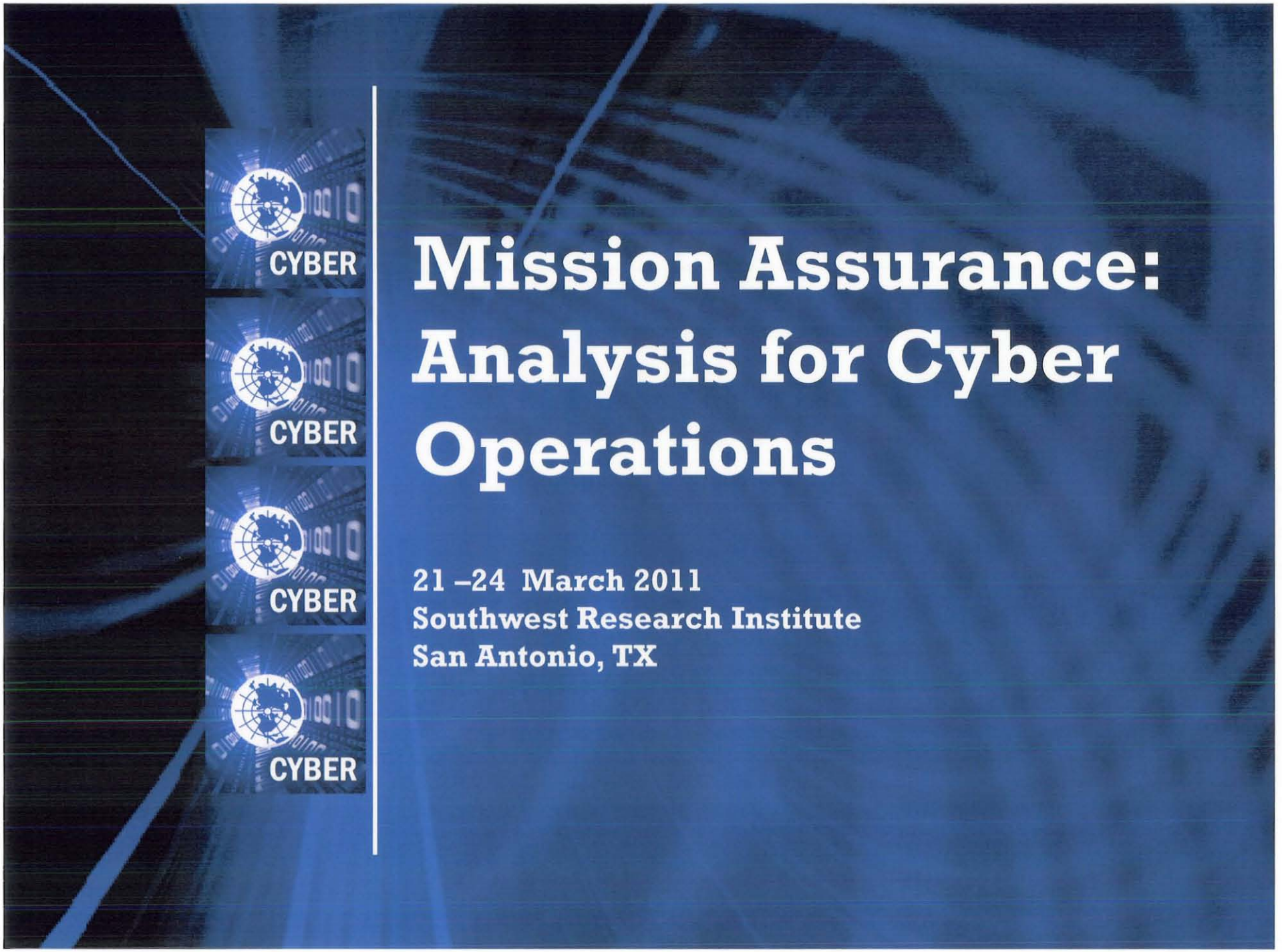

Mission Assurance: Analysis for Cyber Operations

21 –24 March 2011
Southwest Research Institute
San Antonio, TX

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Working Group 2 Establish & Expand the Network

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WG Purpose/Focus

To discuss initial steps necessary for how we can jointly establish and extend cyberspace capabilities in land, air, sea, and space environments in a standard and consistent fashion for the joint warfighter to ensure mission assurance

Major Topics:

- C2 and situational awareness
- Identify analytical gaps to tie operations research with Cyberspace community
- Rapid requirements development and acquisition strategies

WG Findings

Questions to be answered…

- **How should we determine current and emerging capability requirements as we establish and expand the network?**
  - Need analytical methodologies to measure current and emerging capability gaps
  - Need methodology to quickly, yet completely define requirements to satisfy rapid acquisition process
  - Need analytical approaches to prioritize cyberspace capabilities to meet warfighter needs given limited resources

- **How do we determine cyber situational awareness requirements for individual stakeholders?**
  - Need cyber stakeholder decision tool to identify situational awareness data requirements

WG Findings

Questions to be answered…

- **How do we map mission dependencies → application → network?**
  - Need decision aids to balance network establish and extend actions against mission assurance

- **How do we apply both operational and technical modeling to meet functional requirements and mission assurance?**
  - Force-on-force modeling tools don't have high fidelity representations of the network whereas technical modeling tools do, and vice versa
  - Need to combine force-on-force and network modeling capabilities to identify network effects on combat and combat effects on the network

WG Findings

Key data questions…

- How do we define cyberspace metrics (i.e.. bandwidth, scalability, cost, functionality, confidentiality/Integrity/availability, etc) in terms of mission assurance?
- What are the current capabilities/portfolios?
- What is the relationship between mission requirements to cyber parameters and resources?
- What are the capability thresholds of a given network?
- What situational awareness elements are needed to establish whether high network utilization is a spurious event, an external event, or a trigger to extend network bandwidth?
- Given the force structure for a mission, what is the baseline network topology?
- What are the technical specifications of a given system?

WG Findings

Tools required…

- Combat XXI, STORM, and/or OneSAF married/integrated to OPNET/QUALNET/ STEALTHNET– like cyber representation
  - Allows for detailed comm analysis to mission/information exchange requirements
  - Allows for identification of linkages between combat capabilities and cyberspace capabilities
- Standard suite of network tools
- Statistical process control, decision analysis, and other operations research tools
- Process flow chart

WG Findings

Ways forward

- Build a collaborative environment between analysts and cyber operators
- Apply operations research to determine whether we apply the right resources in the cyber domain
- Define a quantifiable way of measuring mission assurance

WG Summary

- Cyber has not applied operations research to establish and extend the network
- Cyber needs to clearly define the current network structure and business rules so that the operations research community can apply analytics to cyberspace
- Operations research needs to develop cyber-focused analytical tools and methodologies